ITS Technical Bulletin

# NATURAL 3.1.3 Implementation

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Effective Oct 22, 2000, ITS Database Administration will start upgrading the new version of NATURAL products. The following versions of software will be installed:

NATURAL 3.1.3
NATURAL/CICS Interface 2.3.5
NATURAL Optimizer Compiler 2.3.5
NATURAL Advanced Facilities 2.3.5
NATURAL Security 3.1.3
NATURAL VSAM 2.4.5

This implementation will span several dates. Listed below is the proposed installation schedule:

| **Date** | **Environments** |
|---|---|
| Oct. 22, 2000 | Salt Lake (Development, Acceptance Test, Training),<br>Education Development |
| Nov. 5, 2000 | Richfield Development, Richfield Acceptance Test, Richfield Training |
| Nov. 19, 2000 | Richfield General Government, Education Production, Richfield Maintenance |
| Dec. 3, 2000 | Criminal Justice, Human Services, Workforce Services,<br>Salt Lake Maintenance |

Please review the attached release notes (see below) for changes that may affect coding and functionality of programs.

# New Statements

## DEFINE WORK FILE

The statement DEFINE WORK FILE, which has already been available with Natural on other platforms, is now also available with Natural on mainframe computers.  It is used to assign a file name to a Natural work-file number within a Natural application. This allows you to make or change work-file assignments dynamically within a Natural session or overwrite work-file assignments made at another level.

## Statements for Component Technology

The new statements listed below, enhance Natural to use the latest technology for the development of component-based applications basing upon Microsoft's component object model.

**CREATE OBJECT**
**DEFINE CLASS**
**INTERFACE**
**METHOD**
**PROPERTY**
**SEND METHOD**

For information on NaturalX, see NaturalX - Overview.

# New System Variables

The following new system variables are available:

**Variable Function**

***NET-USER** contains the complete user ID (including domain name) of an authenticated client request to a NaturalX server.

***OCCURRENCE** contains, at runtime, the actual number of occurrences of an array defined with a variable index range "(1:V)" in a parameter data area.

***SCREEN-IO** indicates whether a screen I/O is possible or not.

***SERVER-TYPE** indicates the server type Natural has been started as.

***THIS-OBJECT** is a handle to the object on which a method is being executed (only relevant with NaturalX; see the NaturalX documentation).

# Enhanced Statements

## DEFINE PRINTER

Under OS/390, for a printer number that is defined with access method AM=STD (standard batch), the DEFINE PRINTER statement allows you to specify a logical or a physical data set name to be assigned to
that printer number. You can specify one of the following:

a logical data set name (DD name);
a physical data set name of a cataloged data set, or a physical data set member name;
a path and member name of an HFS file in an MVS UNIX Services environment;
a JES spool file class; "NULLFILE" (to indicate a dummy data set).

When the DEFINE PRINTER statement is executed and a physical data set name, HFS file, spool file class or dummy data set has been specified, the corresponding data set is allocated dynamically. In addition, an existing data set allocated with the same current DD name is automatically de-allocated before the new data set is allocated. For the dynamic allocation and de-allocation of data sets, the user exit USR2021 in library SYSEXT is provided.

For details, see the DEFINE PRINTER statement in the **Natural Statements documentation.**

If the printer option CLOSE=FIN is defined for a printer, the execution of a DEFINE PRINTER statement referencing this printer may now lead to the error NAT1513 - instead of the error NAT1520, as was the case with Natural Version 2.3.

## Password Length (Various Statements)

With Version 2.3 and previous versions, the following applies:
A password specified in a PASSW statement, as well as a password specified as a *constant* in the PASSWORD clause of another statement (for example, FIND and READ), can be **up to 8** characters long. A password specified as a **variable** in a PASSWORD clause must be **exactly 8** characters long.

With Version 3.1, this inconsistency has been removed: A password specified in any statement can be **up to 8** characters long, but may be be shorter. This applies regardless of whether the password is specified as a variable or a constant.

# SQL

## New Statement CALLDBPROC

The new Natural SQL statement CALLDBPROC enables you to invoke a stored procedure of the SQL database system to which Natural is connected.

The stored procedure can be either a Natural subprogram or a program written in another programming language.

In addition to the passing of parameters between the invoking object and the stored procedure, CALLDBPROC supports "result sets"; these make it possible to return a larger amount of data from the stored procedure to the invoking object than would be possible via parameters.
The result sets are "temporary result tables" which are created by the stored procedure and which can be read and processed by the invoking object using a READ RESULT SET statement.

## New Statement READ RESULT

The new Natural SQL statement READ RESULT SET allows you to read a result set which was created
by a stored procedure that was invoked by a previous CALLDBPROC statement.

## New Clause WITH RETURN in SELECT Statement

The SELECT statement provides a new clause, WITH RETURN, as part of the Extended Set (for DB2 databases only). Within a program which operates as a stored procedure, this clause is used to create result sets.

## New Factor *case-expression*

Within scalar expressions, the new factor case-expression is now available as part of the Natural SQL Extended Set (for DB2 databases only).

The general syntax of a case-expression is:

## New Scalar Function NULLIF

The new scalar-function NULLIF is now available as part of the Natural SQL Extended Set (for DB2 databases only).

# New System Commands

The following new system commands are used in conjunction with NaturalX:

DCOMPARM
REGISTER
UNREGISTER

For further information, refer to the NaturalX documentation.

# Enhanced System Commands

## CATALL

With Version 2.3, objects of the types copycode and text are saved when the CATALL function "Catalog" is executed.
With Version 3.1, copycodes and texts are not affected by the "Catalog" function.
With Version 3.1, the map used to issue a CATALL command has been changed. As a result, the sequence of parameters has changed. This applies when the map is filled direct e.g. in Batch mode. We recommend to use the CATALL direct command; see the system command CATALL in the Natural User's Guide for Mainframes.

## COMPOPT

The new compilation option LOWSRCE has been introduced into the system command COMPOPT in order to support the use of lower or mixed-case program sources on mainframe platforms. This measure facilitates the transfer of programs written in mixed/lower-case characters from other platforms to a mainframe environment; see the system command COMPOPT in the Natural User's Guide for Mainframes.

## DUMP

The DUMP command now also supports alternative screen sizes (Model 3, 4 and 5); see the system command DUMP in the Natural User's Guide for Mainframes.

## LIST

The LIST command provides the following enhancements:

On the selection list of objects, you can now enter the following special values in the Date field: YESTERDAY, TODAY, MONTH and YEAR; this will list only objects which were saved/cataloged yesterday, today, in the current month or current year respectively.

The new function LIST EXTENDED enables you to list external subroutines and classes by their 32-character subroutine names and long names respectively (instead of their object names).

On the selection list of objects, you can now mark an object of type subroutine with "LN" to display its subroutine name.

Source-code lines can now be displayed of up a length of 244 characters (except when the current content of the source work area is listed); previously, a maximum of 80 characters could be displayed.

The performance of the subcommands FIND, SCAN and REF has been improved.
For further information, see the system command LIST in the Natural User’s Guide for Mainframes.

### STRUCT

With Version 2.3, the STRUCT command indents a subordinate SELECT statement within a SELECT statement block if the subordinate SELECT begins on a new source-code line.

With Version 3.1, no such indentation is performed.

### TECH

The TECH command provides the following enhancements:

The new user exit USR2026 in library SYSEXT allows you to access the information provided by the

TECH command from within your Natural application.

For each programming object, TECH now displays the line number of the statement which invokes the next subordinate programming object.

For further information, see the system command TECH in the Natural User’s Guide for Mainframes.

## System Command Removed

### SYSBUS

The system command SYSBUS (which had the same function as the system command BUS) was available with Version 2.3 for Software-AG-internal testing purposes. With Version 3.1, this command is no longer available.

## Debugging Utility

### New Function "Statement Execution Statistics"

The Debugging utility provides a new function "Statement Execution Statistics". With this function, you can obtain statistical information about which statement lines of invoked programming objects were executed - and how often - during the execution of an application,

Statement execution statistics can be used to:

detect "dead" or untested code in an application,
estimate the coverage of an application test (how many statement lines have not been executed for testing),
locate frequently executed code segments that could have an impact on the application's performance.

## Call Statistics Utility

### DISPLAY/PRINT FULL Commands Renamed

In the Call Statistics utility, the direct commands DISPLAY FULL and PRINT FULL, which are used to display and print the "Call Statistics" screen, have been renamed and are now called DISPLAY OBJECT and PRINT OBJECT respectively.

## Data Area Editor

The Data Area Editor provides the following enhancements:
You can now define fields of type "handle of object" in a data area.
You can now define globally unique IDs (GUIDs) in a data area
(GUIDs are used in conjunction with NaturalX).

The new editor command SET PREFIX allows you to specify a prefix for field names. This prefix is then automatically placed before the names entered in the Name column for all fields subsequently defined. This allows you to easily define multiple fields with similar names.

# New Natural-Related Product

Together with Natural Version 3.1, a new Natural-related Software AG product is available:

NaturalX

# NaturalX (Support of DCOM)

With Natural 3.1 and NaturalX, you can write distributed object-based applications and distribute them with DCOM (distributed component object model).

This enables you to:

allow your components to be accessed by other object-oriented components,
execute these components on local or remote servers,
access object-oriented components written in a variety of programming languages across process and machine boundaries from within Natural programs,
wrap existing Natural applications into object-oriented components.

The following concepts have been introduced into Natural: classes, objects, interfaces, methods, and properties.

To integrate the new concepts smoothly into Natural, existing Natural concepts are used. Existing object types, like local data area and subprogram, are used in new contexts. A new Natural object type is introduced: the class.

The Natural programming language has been extended to include object-oriented instructions. For this purpose, the new statements CREATE OBJECT, DEFINE CLASS, SEND METHOD, INTERFACE, METHOD and PROPERTY as well as the new system variable *THIS-OBJECT are available.

The new system commands DCOMPARM, REGISTER and UNREGISTER, as well as the new profile parameter DCOM and corresponding macro NTDCOM are available in conjunction with NaturalX. In addition, a new format for the definition of user-defined variables, is provided: HANDLE OF OBJECT. For details on NaturalX, please refer to the NaturalX documentation.

## Restrictions

With Version 3.1.2 of Natural, the following NaturalX-related functions are not yet available:
The definition of object handles within a global data area or as an application-independent variable is not yet possible.

The profile parameter DCOM=(AUTOREG=ON) is not yet evaluated, but ignored. This means that a class is not automatically registered when stowed/cataloged, nor automatically unregistered when deleted.

With the next version, these functions will be available.